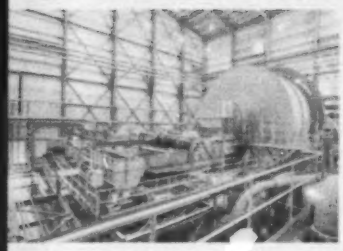
Annual Report of the
Chief Inspector of Mines
2012

BRITISH COLUMBIA

Ministry of
Energy and Mines



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1 Principal Mining Functions

1.1 Mining Health and Safety Function

1.1.1 Mandate/Activities

The Province developed its mining health and safety mandate from the Mines Act and the accompanying Health, Safety and Reclamation Code for Mines in British Columbia (the Code).

The Code is reviewed on an ongoing basis by the Code Review Committee, which consists of labour, industry and government representatives. This committee, chaired by the Chief Inspector of Mines, ensures the Code remains current as new technologies, mining practices and health and safety concerns emerge. The most recent version of the Code was released in December 2008.

The Province's key priority with respect to mine health and safety is to ensure the health and safety of workers and the public. In order to fulfill this mandate, the mine health and safety function encompasses the following responsibilities:

- review aspects of mining and exploration proposals related to health and safety;
- mine inspections and the monitoring of mining activity for compliance with the Mines Act and the Code;
- approval of mine plans with regard to health and safety concerns;
- completion of audits to evaluate health and safety program implementation at mines;
- data collection and maintenance of records with respect to accidents, dangerous occurrences, inspection frequencies and audiometric (hearing test) data; and
- participation in relevant research and development projects to enhance procedures, technology and practices in mine health and safety.

1.1.2 Mine Rescue Stations

Regional mine rescue stations were consolidated in 1999. All mine rescue equipment is now located in a centrally located station in Kamloops. This station is supervised by the Inspector of Mines, Health and Safety based in Kamloops, and the Deputy Chief Inspector of Mines, Health and Safety in Victoria.

1.2 Mining Administration Function

1.2.1 Mandate/Activities

The Province administers and regulates the full mining cycle, including exploration, development, production, closure and reclamation for metal, placer, industrial mineral and coal mines, as well as gravel pits and quarries located in British Columbia. This mandate includes:

- reviewing applications and issuance of permits under section 10 of the Mines Act for all mining activities taking place in B.C., including major mining projects subject to the Environmental Assessment Act;
- establishing geotechnical and reclamation standards and security levels;
- participating in regional and sub-regional planning; and
- reviewing draft legislation and policies being developed by other agencies.

In addition to fulfilling health and safety functions outlined in section 1.1 of this report, Inspectors of Mines from the Ministry of Energy and Mines (MEM) address the environmental and social sensitivities of proposed and permitted mines. The process for reviewing Mines Act permit applications includes consultation with other government agencies, First Nations and affected stakeholders to identify concerns to be addressed through site-specific permit conditions. Inspectors continually monitor mining activities to ensure compliance with these permit conditions and take enforcement actions as required.

The Province has been working to refine the authorizations process for major mine projects to make it more efficient. Proponents of major mine projects are now encouraged to bundle multiple applications for authorizations to enable a co-ordinated review through Mine Development Review Committees (MDRCs).

A MDRC is formed for each major mine proposal in British Columbia once the project reaches the Mines Act permitting stage. The MDRC is chaired by the Ministry of Forests, Lands and Natural Resources (FLNRO) project manager assigned to the major mine project and includes representatives from MEM, FLNRO, the Ministry of Environment, and other relevant provincial agencies. Individual MDRCs may also include representatives from local government, First Nations, or federal agencies. In 2011-12, MEM collaborated extensively with FLNRO to provide training and mentoring for project managers and other FLNRO staff who are involved in the co-ordinated authorizations process for major mines.

Inspectors of mines and other provincial staff also provide guidance and assistance to companies and individuals exploring for minerals, and monitor exploration and mining

activities to provide advice to government in developing policy and working with stakeholders.

1.2.2 2012 Sector Highlights

A global recovery in commodity prices helped sustain many of the gains made in B.C.'s mineral exploration and mining sector in the previous record-setting year. According to Natural Resources Canada, the production value of B.C. mining fell slightly to $8.3 billion in 2012 from $8.6 billion in 2011, which was the highest total ever. Estimates generated by the Province's regional geologists indicated that exploration expenditures in British Columbia were more than $640 million for 2012, also a record. This was another busy year for mine development, with 38 projects moving through the permitting process.

In August 2011, the Province released Canada Starts Here: The BC Jobs Plan. It identified mining as one of British Columbia's eight key sectors for continued economic growth and contained a number of targets specific to mineral exploration and mining, including:

- Eight new mines and nine mine expansions by 2015
- Reduce the backlog of permit applications (Notices of Work) for exploration
- Maintain an average 60-day turnaround time for processing Notices of Work for exploration from 2013 onwards

Throughout 2012, the mining administration function was modified to make progress on these BC Jobs Plan commitments.

Increased exploration and mining activity means increased benefits for communities, First Nations and the provincial economy. It also means that government's mining health and safety and administration functions are more important than ever. British Columbia's Mineral Exploration and Mining Strategy, released by the Province in May 2012, builds on commitments made in the BC Jobs Plan and helps guide the Province's mining health and safety and administration functions as they continue to develop to meet the needs of this dynamic sector.

2 Health & Safety

2.1 Occupational Health Section

2.1.1 Roles and Responsibilities

The Occupational Health Section assists in the anticipation, recognition, evaluation and control of health hazards. The section provides materials for health and safety education and training, and sets standards for the inspection and enforcement of occupational health issues for mines in British Columbia.

The Health, Safety and Reclamation Code for Mines in British Columbia requires Mine Managers to develop and implement a written occupational hygiene-monitoring program to establish procedures and measure chemical and physical hazards to which their workers are exposed in the workplace. These hazards can include dusts, silica, respirable combustible dust, noise, gases and fumes, radiation (ionizing and non-ionizing) and heat/cold stress. The Occupational Health (OH) section makes comparative measurements to ensure companies follow proper procedures and obtain accurate results.

A written preventative training program that educates the workforce and the Occupational Health and Safety Committee members on the recognition, evaluation and prevention of adverse health effects resulting in musculoskeletal disorders is also a requirement of the Code. Such musculoskeletal disorders may consist of lower back injury, repetitive strain, overexertion or vibration-induced injuries. Training must include a practical component that involves identifying and evaluating risks to develop practical solutions. The OH group assists mines in this training area by providing information and assistance as needed.

Medical Surveillance and Workplace Hazardous Materials Information System (WHMIS) programs are included in the OH section's responsibilities. OH staff also provides assistance in program development.

2.1.2 Structure and Organization

During 2012, there were three full-time persons and two co-op students in the OH group responsible for this work:

- Manager Occupational Health
  - Inspector of Mines Occupational Health
  - Occupational Health Co-op Student

- Inspector of Mines Ergonomics
    - Ergonomics Program Assistant (Co-op student)

2.1.3 Summary of Activities

In 2012, the OH group

- conducted onsite inspections of mines to fulfill its mandate to monitor workplace conditions;
- participated in health and safety audits at mines;
- evaluated respirable silica and noise exposure at small sand and gravel operations and provided exposure prevention education
- provided four Musculoskeletal Disorder Prevention Trainings sessions to industry; and,
- organized the Mine Safety Awards and Provincial Mine Rescue Competition.

2.2 Mechanical and Electrical Engineering

2.2.1 Roles and Responsibilities

Mechanical and electrical inspectors ensure that all mechanical and electrical equipment installed and used at mines in B.C. complies with the Mines Act and applicable codes and standards, and that this equipment is maintained and operated appropriately so that it causes no hazard to people or property.

2.2.2 Structure and Organization

There is a Senior Inspector of Mines, Mechanical, based in Prince George and an Inspector of Mines, Mechanical, based in Kamloops. There is also a Senior Inspector of Mines, Electrical and an Inspector of Mines, Electrical, based in Kamloops.

In 2012, there was a great deal of activity with new and re-opened mines. There was a significant demand on the mechanical and electrical engineering section to keep up with the design, approval and construction plans of the new mines, such as Mt. Milligan and Red Chris, as well as rehabilitation and improvement plans of existing operations, such as Endako's new mill. The Mechanical and Electrical Engineering section worked with the provincial audit group and participated in or provided input for five new mine audits in 2012. The engineering section participated in a focused Inspection in the Lower Mainland and the Provincial Mine Rescue Competition in Revelstoke.

In addition, the various staff from both Mechanical and Electrical conducted numerous site inspections around the Province. The Senior Inspector, Electrical, co-instructed a combined Surface and Underground Mine Rescue course, in Kamloops, for Ministry Inspectors in February.

2.2.3 Summary of Activities

Mechanical Engineering

Delivering new machinery and equipment to mines, together with upgrading existing items, enables mines in British Columbia to maintain their competitive capabilities. At the same time, safety systems of new and upgraded equipment are usually enhanced, often as a result of new technology. The highly automated and complex control systems found in new equipment demand a high level of skill from those who operate and maintain the equipment. Provincial staff are involved in reviewing engineering drawings associated with the safety systems of this equipment prior to installing and inspecting the items. Staff endeavour to stay abreast of the many changes and innovations in their field. Mine managers, in collaboration with inspectors, have to ensure that equipment operators are aware of how equipment modifications may affect operating functions. They must also ensure that operators, maintenance personnel and supervisors understand the consequences should failures occur in installed control or sensing systems.

In 2012, mechanical inspectors also participated in review committees for CSA Standard Z150-11 (Safety Code on Mobile Cranes), CSA Standard Z150.3-11 (Safety Code on Articulating Boom Cranes), CAN/CSA Standard M422-M87 (Fire-Performance and Antistatic Requirements for Conveyor Belting), and CSA Standard G4-09 (Wire rope).

Electrical Engineering

In 2012, electrical inspectors performed electrical inspections at major mines and large sand and gravel operations across the province, as well as at some smaller sand and gravel/quarry operations. Several new operations required extra inspections and reviews of engineering specifications and drawings, and a number of new projects were reviewed for compliance. All of these operations required considerable time for the review of their new equipment and installations to ensure compliance with the necessary B.C. and Canadian code requirements.

Section inspectors were also on the 2012 review committee for CSA Standard M421-11 (Use of Electricity in Mines). The committee is working on the next edition of the code.

2.3 Competitions and Awards

2.3.1 Roles and Responsibilities

The primary mandate of the mining health and safety branch is to ensure worker health and safety, public safety and reclamation and protection of the land and watercourses affected by mining and exploration in B.C. The Mines Act and the Code specify the legal responsibility of provincial mining companies in meeting this mandate. However, many B.C. mining companies and their individual workers voluntarily and consistently exceed these legal requirements. Through the efforts of these individuals, companies and staff of the Province of British Columbia, mining is one of B.C.'s safest heavy industries.

Mine rescue competitions, first aid competitions and safety awards all promote and encourage safety at B.C. mines. Reclamation awards (see section 4.2.8) acknowledge those companies that go beyond their mine plans by conducting superior research and introducing innovative techniques to restore the land.

2.3.2 Mine Rescue Competitions

The 57th annual Provincial Mine Rescue and First Aid Competition was held at the Revelstoke Community Centre in Revelstoke on June 9, 2012. The various components of this yearly event are judged by mines inspectors and industry personnel who are responsible for all aspects of worker and public safety in B.C.'s mining sector.

Underground Mine Rescue – Overall Winner

The overall winner of the Underground Mine Rescue trophy in 2012 was Nyrstar's Myra Falls mine rescue team.

Surface Mine Rescue – Overall Winner

The team from Highland Valley Copper won the overall Surface Mine Rescue Trophy in 2012.

Surface Bench Competition

The surface bench competition originated in 1995. The Maurice Boisse Memorial Trophy is awarded to the surface mine rescue team that excels at the practical bench competition. The practical bench task is designed to test individual team members on their knowledge and practical skills in mine rescue equipment and techniques. This competition is held in memory of Maurice Boisse, Mine Rescue Team Coach, Island Copper Mine.

In 2012, the mine rescue team from Huckleberry Mines Ltd.won the award for best bench for a surface team.

Underground Bench Competition

The underground bench competition originated in 1978. This competition is held in memory of the late Barry Abbott, Captain of the Cominco HB mine rescue team, which won the Canadian Championship in 1976. In 2012, the Barry Abbot Memorial Trophy was won by the mine rescue team from Nyrstar's Myra Falls mine.

Obstacle and Recovery

Quinsam Coal Mine provides this award in recognition of the contribution made by Keith Bracewell to the underground mine rescue competition. This award recognizes the winning team in obstacle and recovery, the largest task in the underground competition, an area that Keith worked hard to develop and improve upon. Nyrstar's Myra Falls mine rescue team won the Keith Bracewell Memorial Award in 2012.

2.3.3 First Aid Competitions

There are two separate competitions in the first aid category: the three-person miners' first aid competition and the first aid component of the underground mine rescue competition.

Underground First Aid

This award, known as the Sullivan Cup, was originally introduced by Cominco Ltd. to recognize the best first aid by an underground mine rescue team. In 2012, the Sullivan Cup was presented to the mine rescue team from Quinsam Coal Corp.

Three- Person Miners' First Aid

The first provincial miners' three-person first aid competition was held in 1978. Following the completion of a short written exam, the three team members perform first aid. The St. John Ambulance standard-level first aid course is the training standard, and only those who work at a mine are permitted to enter this competition. The three-person first aid competition is designed to be an extension of training in basic first aid skills and is a unique way for teams to prepare to assist their fellow workers in the event of an injury or medical emergency.

The 2012 three-person first aid winning team was from Huckleberry Mines Ltd. Huckleberry Mines Ltd. also won the 2012 Kathy Lofstrom Memorial Trophy for best coach of a first aid team.

2.3.4 51st Annual Mine Safety Awards

The 51st Annual Mine Safety Awards were handed out to 19 mines and quarries that accumulated 15,000 or more worker or contractor hours and had no fatalities between the period of January 1 and December 31, 2012. Recipients were celebrated at a banquet in Revelstoke, B.C. on June 8, 2013. Awards were presented in the following five categories.

Small Underground Mine Safety Award

This award was donated by the West Kootenay Mine and Industrial Safety Association in 1951 to encourage and promote safety in small underground mines. Since 1956, the competition has been open to qualifying mines throughout B.C. The award is given to the mine having the lowest compensable injury-frequency rate after working between 20,000 and 240,000 hours, one-third of which were underground. The mine must have operated for at least nine months during the calendar year, and a fatality automatically disqualifies a mine for that year. No mines qualified for this award for this award in 2012, as most underground mines in the province compete in the "large" mines category..

Large Underground Mine Safety Award

This award was created in 2010 to recognize safety excellence in underground mines with more than 240,000 hours. The award is given to the mine with the lowest compensable injury-frequency rate with more than 240,000 worker hours, one-third of which were underground. The mine must have operated for at least nine months during the calendar year, and a fatality automatically disqualifies a mine for that year. The 2012 recipients were Nyrstar's Myra Falls Operation and Quinsam Coal Corporation.

John Ash Award (Open- Pit Mines and Quarries)

This award is presented to the mine that has worked a minimum of 1,000,000 hours in a year and attained the lowest compensable injury-frequency rate. The 2012 recipient was Thompson Creek Metals' Mount Milligan mine.

Edward Prior Award (Open- Pit Mines and Quarries)

This award is presented to operations that logged between 200,000 and 1,000,000 worker hours and had the lowest compensable injury-frequency rate. The 2012 recipients were Teck Resources Ltd.'s Coal Mountain Operations and Quintette Mine.

Stewart/O'Brian Safety Award (Open- Pit Mines and Quarries)

This award is presented to operations that logged between 35,000 and 200,000 worker hours and had the lowest compensable injury-frequency rate. The 2012 award was shared by seven mines:

- Pit D (Allard Contractors Ltd.)
- Kemess Mine (AuRico Gold Inc.)
- Central Aggregates (Lafarge Canada Inc.)
- Earle Creek Aggregates (Lafarge Canada Inc.)
- Pitt River Quarries (Lafarge Canada Inc.)
- Sechelt Mine (Lehigh Materials)
- Ward Road Quarry (Summit Crushing)

2.3.5 Certificates of Achievement & Special Commendations and Awards

Certificates of Achievement

Certificates of Achievement are presented to mines with a minimum of 15,000 worker hours and an injury-frequency ratio of zero. There were a total of seven mines that qualified for certificates for work conducted in 2012:

- Mission Pit (Allard Contractors Ltd.)
- Keating Pit (Ballard Brothers Supplies Ltd.)
- Duncan Aggregate (Ballard Brothers Supplies Ltd.)
- Windermere Mining Operation (CertainTeed Gypsum Canada Inc.)
- Sumas Shale Quarry (Fraser Pacific Enterprises Inc.)
- Jervis Inlet Mine (Jack Cewe Ltd.)
- Harper Ranch Quarry (Plateau Construction Ltd.)

Chief Inspector of Mines' Recognition Award

The Chief Inspector of Mines' Recognition Award is a merit-based award intended to recognize mine sites and/or individuals that have accomplished outstanding achievements in or have greatly advanced health and safety at mines.

At the 51st annual Mine Safety Awards, three Chief Inspector's Recognition Awards were handed out for outstanding career contributions to health and safety:

- The Peace River Coal Mine Rescue Team
  - For service to their community
- Don Sander (Line Creek Operations)
  - For Leadership in Innovative Technological Approaches to Mine Health and Safety
- John Cox (Ministry of Energy and Mines)
  - For Outstanding career contributions to health and safety

2.3.6 National Safety Awards – John T. Ryan Trophies

John T. Ryan trophies are provided by Mine Safety Appliances Canada Limited as a memorial to the founder of the company. The trophies are awarded by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) to the metal mine, the coal mine and the select mine which, in the previous year, experienced the lowest reportable injury frequency per 200,000 employee hours in all of Canada. There are two trophy categories: Canada and Regional. Myra Falls Nyrstar mine operation was awarded the BC Yukon regional award for the lowest reportable injury frequency in the metal mine category in 2012 calendar year.

2.4 Examinations and Certifications

Section 26 of the Mines Act states that every person employed at a mine must, if required by the regulations or the Code, be under the daily supervision of a person who holds a valid and appropriate certificate as required by the regulations or the Code. The required certification is specified in Part 1.12 of the Code. Recipients of a valid permanent certificate must complete re-examination every five years to ensure that their knowledge of the Code remains current.

2.4.1 Board of Examiners

The Board of Examiners is made up of the Chief Inspector of Mines as chair and other inspectors appointed by the Chief Inspector. 2012 board members were A. Hoffman, E. Taje, R. Thorpe, R. Booth and D. Howe. The board is responsible for:

- examining applicants for First and Second Class Underground Coal Mine Manager, fireboss and shiftboss certificates and certificates of competency;
- issuing certificates;
- conducting reviews of suspended certificates;
- administering blasting certificates; and
- reviewing qualifications and ensuring certification validity among other provinces.

2.4.2 Shiftboss Certificates

The following table summarizes shiftboss certification activity in 2012:

Activity	New Certificates
Examinations written (surface)	135
Examinations written (underground)	31
Number passed (surface)	135
Number passed (underground)	31
Total permanent certificates issued	166

Three shiftboss certificates were suspended in 2012.

2.4.3 Total Underground Coal Fireboss Certifications

No underground coal fireboss certificates were issued in 2012.

2.4.4 Blasting Certificates

Blasting certification is required under Part 8.2.1 of the Code. Types of blasting certificates include:

- Basic
- Exploration
- Surface
- Underground
- Underground Coal (Shotfirer)
- Electrical
- General (which includes all categories except for Underground Coal)

A total of 136 blasting certificates were issued in 2012, and 6 blasting certificates were suspended.

2.4.5 Mine Rescue Certifications

To qualify for mine rescue certification, mine employees must complete approved training and must pass written exams developed for various types of mining, as per Part 3 of the Code.

The Province is responsible for certifying miners in several categories of mine rescue, as listed below. The following mine rescue certificates were issued in 2012:

Type	Number Issued
Underground mine rescue	115
Surface (open- pit) mine rescue	504
Gravel pit mine rescue	0
Total certificates issued	619

One interchange First Class Certificate of Competency was issued in 2012.

2.5 Accidents and Incidents

2.5.1 Dangerous or Unusual Occurrences

Inspectors of Mines are responsible for determining which incidents should be included in the Mine Management System (MMS). These decisions are influenced by workload and staffing levels. In the past few years, Occupational Health and Safety Committees at the mines have been the primary incident investigators, requiring less involvement from inspectors. There were 242 dangerous occurrences entered into MMS in 2012, compared to 237 dangerous occurrences entered in 2011.

Location of Incident	Number of Incidents Reported	% of Total Incidents Reported
Pit	109	50.2
Plant/Mill	25	11.5
Maintenance (Shop	10	4.6
Maintenance (Field)	11	5.1
Highwall	3	1.4
Dump	9	4.1
Tailings Pond	3	1.4
Office	1	0.5
Dry	2	0.9
Underground General	2	0.9
Underground Face	0	0
Underground Outbye/Haulage Drift	2	0.9

Work Practice Contributing to Incident	Number of Incidents Reported	% of Total Incidents Reported
Equipment Failure	40	18
Inadequate Planning	76	35
Inadequate Management	22	10
Inadequate Equipment	8	4
Poor Work Standards	33	15
Abuse or Misuse	9	4
Training	55	25
Not Following Work Procedures	76	35
Operator Error	108	50

Equipment Involved	Number of Incidents Reported	% of Total Incidents Reported
Haul Truck	49	22.6
Grader	1	0.5
Loader	9	4.1
Shovel	11	5.1
Dozer	19	8.8
Drill, Surface	29	13.4
Drill, Underground	2	0.9
Pickup	20	9.2
LHD	1	0.5
Conveyer	13	6.0
Electrical	18	8.3
Explosives	21	9.7
Excavator/Backhoe	8	3.7
Crane	1	0.5
Forklift	3	1.4
Water Truck	3	1.4
Scraper	0	0
Service Truck	9	4.1

Note: The numbers in the tables shown above are not intended to add up to 100% as there may be several preventative actions, locations, work practices or equipment involved for a single incident.

General Incident Information	Number of Incidents Reported	% of Total Incidents Reported
Number of Persons Involved	242	n/a
Number of Persons Injured	35	n/a
Average Time Into Shift (minutes)	56	n/a
Near Miss	82	38
Fire	20	9.0
Geotechnical	4	2.0
Fatality (Mining Related)	1	-
Fatality (Non- mining)	1	-

2.5.2 Injury Rates for Open Pit Coal, Open Pit Metal and Underground Mines

According to WorkSafeBC data, the 2012 total estimated injury rate (weighted average) at open pit coal, open pit metal and underground mines in British Columbia was 1.12. The rate has decreased from 2011's estimated injury rate of 1.29. The unit for the injury rate statistic is the "number of claims per 100 estimated person-years of employment", where "number of claims" refers to those that received standard, limited or survivor benefits in the year of injury or in the first quarter of the year following the year of injury. The estimated injury rates are adjusted on an ongoing basis to match claims data.

In 2012, the estimated injury rate for open pit metal mines decreased from 1.5 in 2011 to 1.4, and remained at 0.9 for open pit coal mines. The estimated injury rate for underground mines rate also decreased, from 2.9 in 2011 to 1.4 in 2012.

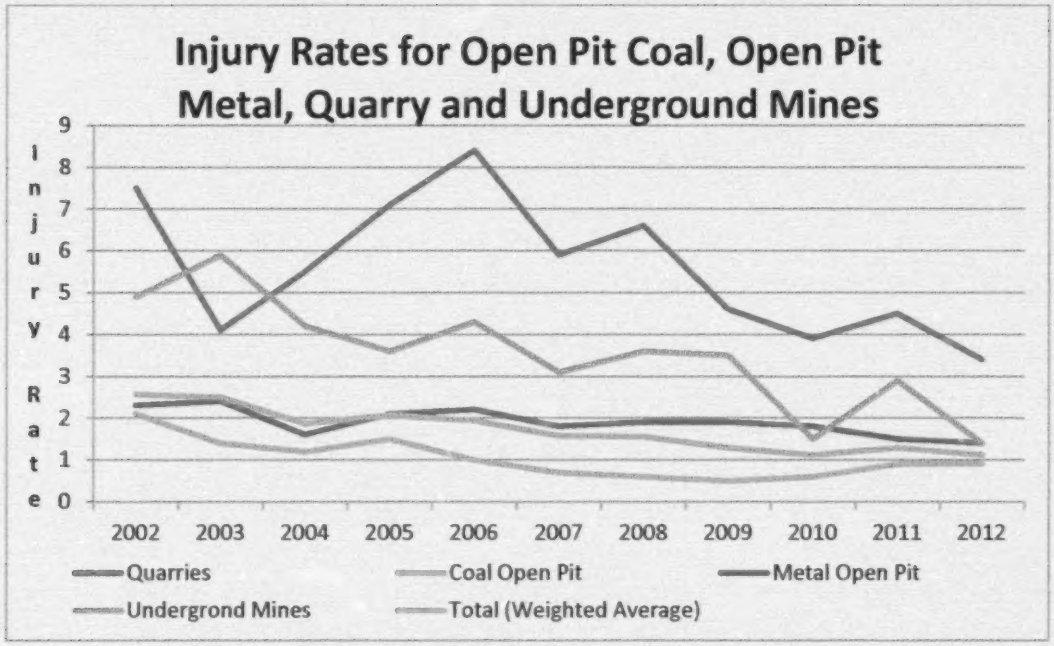


Figure 1: Injury Rates for Open Pit Coal, Open Pit Metal, Quarry, and Underground Mines in British Columbia, 2001–2012

To date, WorkSafeBC has accepted a total of 173 short-term disability, long-term disability and fatal claims for 2011, up from 171 in 2010. There was an increase in worker days lost from 8,880 in 2011 to 10,741 in 2012.

2.5.3 FATALITIES

There was one mine operation–related fatality which occurred on October 23, 2012. Mr. Pat Lawrence Desmarais was fatally injured when he was swept off a mountain side by an avalanche on the KSM mine site.

3 Administration

3.1 Summary of Mine Production

The tables below summarize production and average employment at major mines in British Columbia in 2012.

2012 Production: Coal Mines	Annual Rated Plant Capacity (Tonnes)	Actual Tonnes Produced	% of Capacity	Days Mill Operated	Average Employment	Contract Employment
Coal Mountain	3,301,000	2,682,000	81%	355	312	-
Elkview	5,865,000	4,653,000	79%	301	1,037	-
Fording River	10,096,000	8,920,000	88%	320	1,194	-
Greenhills	5,100,000	4,509,000	88%	322	617	-
Line Creek	3,816,000	3,416,000	90%	310	514	-
Quinsam Coal	1,500,000	566,000	38%	350	281	-
Walter Energy (Wolverine and Willow Creek)	5,500,000	4,530,000	82%	350	889	-

2012 Production: Metal & Precious Metal Mines	Annual Rated Mill Capacity (Tonnes)	Actual Tonnes Milled	% of Capacity	Days Mill Operated	Average Employment[1]	Contract Employment
Copper Mountain	12,810,000	9,427,000	74%	365	338	-
Endako	18,250,000	14,711,000	81%	365	369	-
Gibraltar	20,130,000	16,302,000	81%	355	521	-
Highland Valley Copper	49,640,000	45,383,000	92%	365	1,295	-
Huckleberry	7,000,000	5,877,000	84%	365	247	-
Mount Polley	7,810,000	7,731,900	99%	365	372	-
New Afton	4,015,000	1,970,000	49%	183	438	-
Myra Falls	675,250	521,824	77%	365	325	-

Source: PricewaterhouseCoopers, Stay the Course: The Mining Industry in British Columbia 2012 (Mining Industry Survey)

1. Average number of employees working during fiscal year.

3.2 Mine Visits

The Mine Management System (MMS) allows for the tracking of mine visits and issuances of orders at mines. When an inspector visits a mine, he or she passes on information about issues to which staff from other areas of government may need to attend.

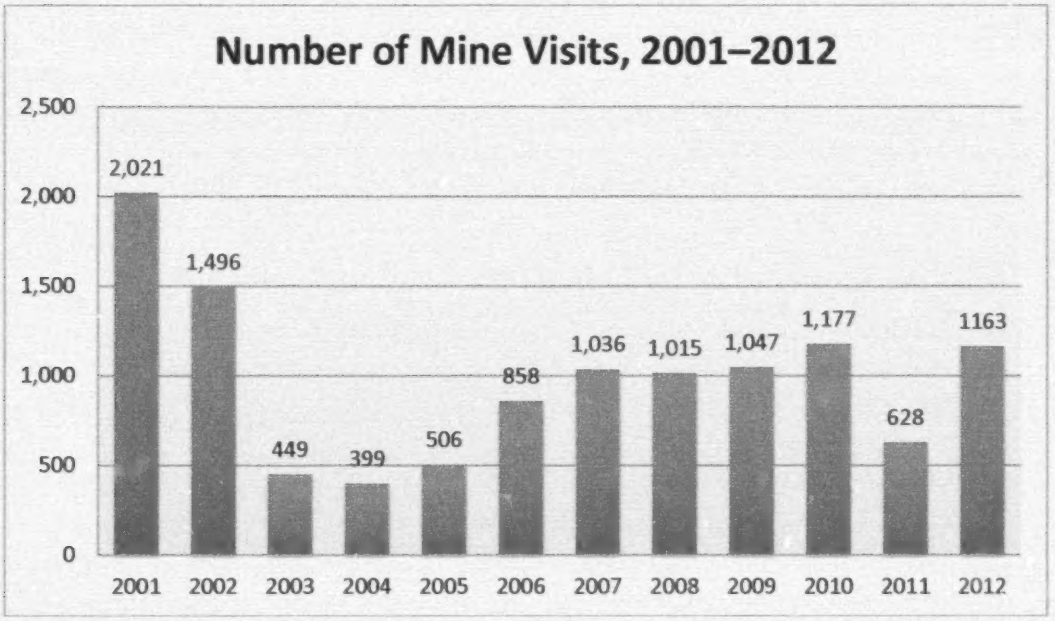


Figure 2: Number of Mine Visits, 2001–2012

In 2012, Inspectors of Mines made 1163 visits to mines, conducted 875 inspections, issued 2356 health and safety orders, and shut down 19 pieces of equipment. Inspectors issued 15 environmental orders during the year. The following table provides a summary of MMS data on visits to mines made in 2012 by mine type.

Mine Type	Inspections	H&S Orders	Equipment Shutdowns	Environmental Orders	Dangerous Occurrence	Investigations	Training	Other
Abandoned	3	0	0	0	0	1	0	2
Custom Mill	2	9	0	0	0	0	0	3
Coal - Surface	67	369	0	15	107	3	20	14
Coal - Underground	13	62	4	13	1	1	1	0
Coal - Exploration	15	42	1	5	9	0	0	11
Exploration - Surface	114	143	6	40	22	4	4	17
Exploration - Underground	21	71	3	0	1	0	0	4
Industrial Minerals - Surface	39	147	18	0	4	0	0	5
Industrial Minerals - Underground	0	0	0	0	0	0	0	0
Metal Leach - Surface	1	0	0	0	0	0	0	0
Metal Mine - Surface	57	194	2	3	55	1	5	11
Metal Mine - Underground	29	131	6	0	6	0	4	7
Non- Assignable/ Unidentified	1	0	0	0	1	0	0	0
Placer - Surface	82	90	6	29	1	0	0	6
Placer - Underground	0	0	0	0	1	0	0	0
Rock Quarry	88	192	2	3	4	3	0	11
Sand/Gravel Pit	343	954	15	18	1	2	0	26
TOTALS	875	2356	63	126	212	15	34	117

3.3 Mine Health and Safety Auditing Program

The Mine Health and Safety Auditing Program is designed to evaluate mines on their implementation of Health and Safety Management Systems for compliance with key sections of the Code. The audit program has been revised to reflect the 2008 version of the Code, and to emphasize the findings of auditing inspectors. The resulting audit reports summarize the findings of the auditors, who base their conclusions on field observations, interviews with mine management and staff, and research of mine records. Audit reports help mine management and workers improve compliance with the Code and their health and safety practices.

In 2012, one follow-up audit was conducted at Copper Mountain. Additionally, follow-up audits were conducted at Gibraltar, Endako and Peace River Coal, and one initial audit was conducted at New Afton.

3.4 Notices of Work

The following Notices of Work and permit information were entered into MMS in 2012.

Type	Notice of Work Applications	Permits Issued	Average # of Days To Issue
Mineral/Coal (Exploration)	434	287	118
Mineral/Coal (other)	119	48	80
Placer	418	185	86
Sand & Gravel	213	122	116
Total	1,184	642	105

The breakdown of the 2012 Notices of Work by region is:

Region	Placer	Sand & Gravel	Mineral & Coal	Total
Central/Northeast	41	56	113	235
Northwest	102	31	104	237
South Central	214	57	140	411
Southeast	52	32	153	237
Southwest	6	28	33	67
Total	415	204	543	1187

The breakdown of the 2012 Notices of Work by month is:

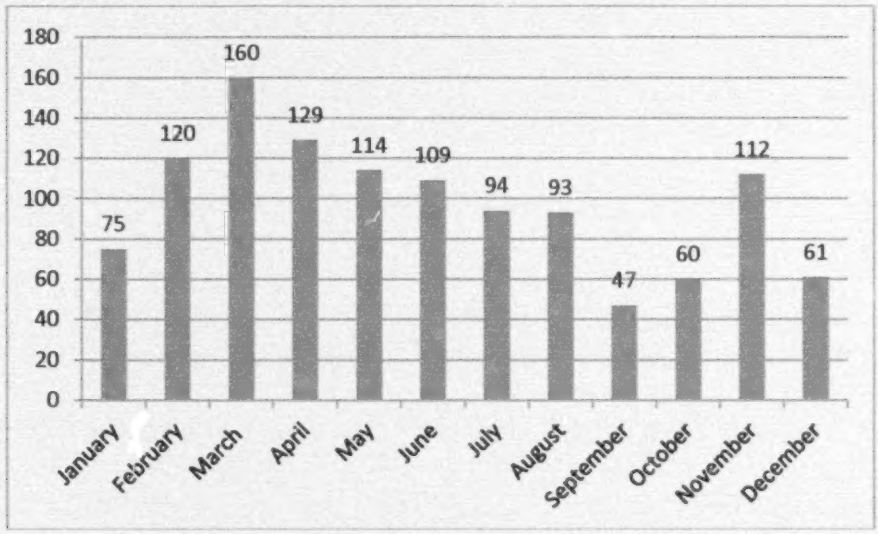


Figure 3: 2012 Notices of Work by Month

The areas covered by the regions are:

- Central/Northeast = Prince George, Omineca, Horsefly and Valemont
- Northwest = Smithers and Skeena
- South Central = Kamloops, Okanagan and Thompson
- Southeast = Cranbrook, Fernie and Elk Valley (Kootenay)
- Southwest = Lower Mainland, Vancouver Island, South Coast and Haida Gwaii

4 Reclamation

4.1 Roles and Responsibilities

Reclamation and environmental protection are major components of all mineral exploration and mine development activities in British Columbia. Since 1969, companies have been required by law to reclaim all lands disturbed by mining and related activities. B.C. was one of the first provinces in Canada to enact mine reclamation legislation, and the first to extend this policy to exploration sites.

Prior to starting work, mining companies are required to obtain a permit approving the mine plan, a program for protection of the land and watercourses, and a reclamation program. Mining companies must also place a security deposit with the Province to ensure reclamation obligations are kept.

The environmental protection and reclamation objectives of the Mines Act and the Health, Safety and Reclamation Code for Mines in British Columbia ensure:

- land and watercourses on mine sites in B.C. are reclaimed to a level equal to that which existed prior to mining;
- disturbed lands and watercourses are re-integrated into the surrounding landscape;
- long-term stability of structures (i.e.. tailing storage facilities); and
- mining and mitigation requirements associated with metal leaching and acid rock drainage (ML/ARD) are conducted in a manner that prevents significant impacts to downstream or onsite biota to minimize reduction in post-mining productive capacity of the site.

To achieve these objectives, the Reclamation and Permitting Section:

- conducts detailed technical reviews of new projects or project revisions under the Environmental Assessment Act;
- conducts detailed technical reviews and issues permits for operating and closed mines with outstanding reclamation responsibilities under Section 10 of the Mines Act;
- inspects mine reclamation activity;
- administers reclamation security deposits on behalf of the Province of British Columbia;
- participates in national and international committees conducting research and technology transfer, including the national Mine Environment Neutral Drainage (MEND) Committee and the National Orphaned and Abandoned Mines Initiative (NOAMI) committee; and,

- organizes and participates in various provincial committees and activities that review and highlight ministry practices, government cooperation with industrial, public and academic institutions (examples include the Technical and Research Committee on Reclamation, the Annual Mine Reclamation Symposium, and the Annual ML/ARD Workshop).

4.1.1 Structure and Organization

The Reclamation and Permitting Section has expertise in the technical areas of soil restoration, re-vegetation, land capability, erosion control, geology, geochemistry and ML/ARD. Technical assistance for biological and effluent discharge and offsite requirements is provided from other areas of government. (For Geotechnical, see Section 4.4)

4.2 Summary of Activities

4.2.1 Permitting

The Reclamation and Permitting Section enforces the reclamation provisions of the Mines Act through permit conditions and detailed technical reviews aimed at finding environmentally sound, economically viable solutions that enable industry to remain internationally competitive without compromising the British Columbia's rigorous environmental standards.

During 2012, activity remained steady with two new mine permits being issued for the Red Chris Mine and Treasure Mountain Mine and 36 permit amendments or approvals for departure being issued, including amendments allowing for expansions at three mine operations: Quinsam, Elkview and Endako. Other permit amendments or approvals were issued to Fording River, Copper Mountain, Trend, Kemess, Craigmont, Greenhills, Tulsequah, Mt Polley, Line Creek, QR, Myra Falls, Leigh, Pem 100, Brule, and Yellowjacket mines.

Type	Permits	Amendments	Total
Metal	2	19	21
Coal	0	15	15
Quarries/Sand & Gravel	0	2	2
Total	2	36	38

Under the Environmental Assessment Act, reviews were conducted for the Morrison, Line Creek II, Roman, and Kitsault projects. The reclamation and permitting staff participated in technical working groups for Ajax, KSM, Chu Molybdenum, Fording

River Swift, Kutcho Creek, Murray River, Harper Creek, Raven, Schaft Creek, and Spanish Mountain projects.

4.2.2 Co- operation and Consultation with Stakeholders

The Reclamation and Permitting Section works closely with industry, other government agencies, First Nations and the public to inform these parties of our activities and ensure that all concerns are considered. For mine applications involving mechanical disturbance of the land surface and/or watercourses, applications are referred to other government agencies, the public, and First Nations when their interests are affected. Additionally, the Reclamation and Permitting Section provides regular information and assistance to the Ministry of Environment, Ministry of Transportation and Infrastructure, Ministry of Forests, Lands and Natural Resources, Environment Canada, First Nations and the public on technical issues involving reclamation. Co-operation facilitated by the Reclamation and Permitting Section between industry, the public, government and the academic community continues to result in a constructive climate for exchanging and disseminating new technology.

4.2.3 Metal Leaching and Acid Rock Drainage (ML/ARD)

A provincial ML/ARD policy, a more detailed set of ML/ARD guidelines, and a manual of recommended methods for the prediction of ML/ARD indicate what constitutes acceptable mine design and adequate technical evidence. These documents provide a checklist for industry and inform the public of regulatory conditions and environmental-protection requirements.

4.2.4 Reclamation Securities and Funds

All mines operating in B.C. must deposit security with the government to ensure that reclamation costs do not fall on provincial taxpayers (e.g., if a mining company goes bankrupt). In the past few years, the value of security deposits has increased to reflect more closely the true costs of reclamation. The total value of securities held by the Province rose from $10 million in 1984 to more than $703 million by the end of 2012.

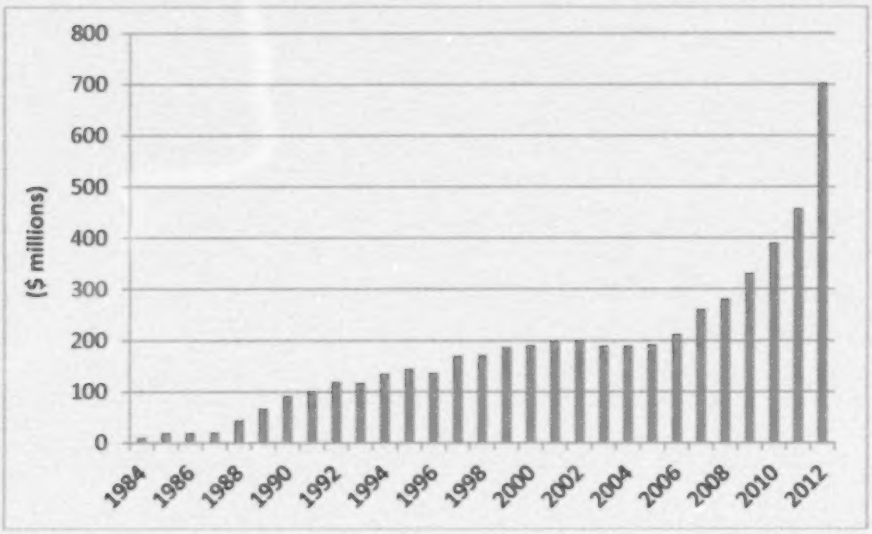


Figure 4: Reclamation Security Deposits Held by the Province (Initiation to 2012)

4.2.5 Technical and Research Committee on Reclamation

The Technical and Research Committee on Reclamation has been actively promoting and fostering reclamation research and information exchange for more than three decades. Members come from the Ministry of Energy and Mines, the Ministry of Environment, mining companies, the Mining Association of British Columbia, Association for Mineral Exploration in BC, Natural Resources Canada, the University of British Columbia and Thompson Rivers University. This committee has been responsible for the organization of the annual B.C. Mine Reclamation Symposium since 1977.

4.2.6 National Orphaned/Abandoned Mine Initiative (NOAMI)

The National Orphaned/Abandoned Mines Advisory Committee was formed in March 2002 at the request of Canadian Mines Ministers. The Advisory Committee was asked to study the issue of orphaned/abandoned mines and to develop initiatives and partnerships to implement remediation programs across Canada.

The Advisory Committee takes direction from Mines Ministers and reports back to them through the Intergovernmental Working Group on the Mineral Industry. The Advisory Committee is made up of representatives of federal/provincial/territorial governments, the Canadian mining industry, environmental non-governmental organizations and Aboriginal peoples and their communities. Committee members are responsible for communication with their constituencies. The Ministry represents the Province of British Columbia on this Advisory Committee.

4.2.7 Mine Reclamation Symposium

The 36th Annual Mine Reclamation Symposium was held at the Kamloops Convention Center September 17–20, 2012. The conference offered delegates the opportunity to participate in pre-conference tours of local grasslands ecosystems and a visit to the reclaimed Samatosum Mine. A total of 20 technical presentations were delivered during the final 2 days of the proceedings.

4.2.8 The Annual British Columbia Mine Reclamation Awards

The Jake McDonald Mine Reclamation Award and up to five category awards are handed out for outstanding achievement in mine reclamation and have been presented at the British Columbia Mine Reclamation Symposium every year since 1977.

The 2012 British Columbia Jake McDonald Mine Reclamation Award was presented Tsolum River Partnership for outstanding reclamation achievements at the historic Mount Washington Copper Mine, located on central Vancouver Island near Courtney.

Four additional category awards were handed out at the 2012 Mine Reclamation Symposium:

- The Metal Mining Award was presented to Gibraltar Mines Ltd. for work at the Gibraltar Mine located near Mcleese Lake in the Cariboo. Gibraltar was presented with the awardfor demonstrating a forward-looking approach to reclamation that will set the stage for future reclamation successes. They were commended for the work being done to review previous reclamation efforts, and for initiating large-scale trials to assess innovative methods for reclaiming large areas of the sand dam and waste rock dumps.
- The Sand and Gravel Award was presented to R.E. Postill and Sons Ltd. and the Coldstream Ranch Ltd. for the Rosebush Pit located near Vernon, for demonstrating success in reclaiming land and improving its end land use capability for farming. R.E. Postill and Sons Ltd. and Coldstream Ranch Ltd. were praised for their work to ensure the area is being mined in a sustainable manner.
- The Industrial Mineral Mine Reclamation Award was presented to Quinto Technologies Inc. for the Lumby Mine for successfully completing their reclamation program; and,
- The Placer Reclamation Award was presented to Eli Christiansen for the Douglas Property for their reclamation efforts to clean up a once messy historical site and reclaim the land back to native vegetation.

4.2.9 Metal Leaching and Acid Rock Drainage Workshop

The 19th annual Metal Leaching and Acid Rock Drainage Workshop was held in Vancouver on November 28 and 29th, 2012. The theme of the workshop was "Challenges and Best Practices in Metal Leaching and Acid Rock Drainage". The workshop was organized by the Ministry of Energy and Mines, Natural Resources Canada and the Mine Environment Neutral Drainage (MEND) program in association with the BC Technical and Research Committee on Reclamation.

4.3 Industry Reclamation Record

Since the late 1960s, land occupied by the mining industry has steadily grown. Major coal and metal mines, which occupied less than 1,000 hectares in 1969, had, by the end of 2012, expanded to cover 47978 hectares. Reclamation (where revegetation has been successfully established for one year or more) has occurred on more than 40 per cent of this disturbed land, or 19495 hectares (Figure 5).

Metal mines have disturbed 25588 hectares, and 10511 hectares (or 40 per cent) of this land have been reclaimed (Figure 6). Coal mines have disturbed 22390 hectares, and 8984 hectares (or 40 per cent) have been reclaimed (Figure 7). An increase in disturbance and decrease in reclamation at mines reflects the construction and development of new mines and the expansion and redevelopment at older mines.

The data presented in Figures 5, 6 and 7 demonstrates the expansion of the mining industry during the past four decades.

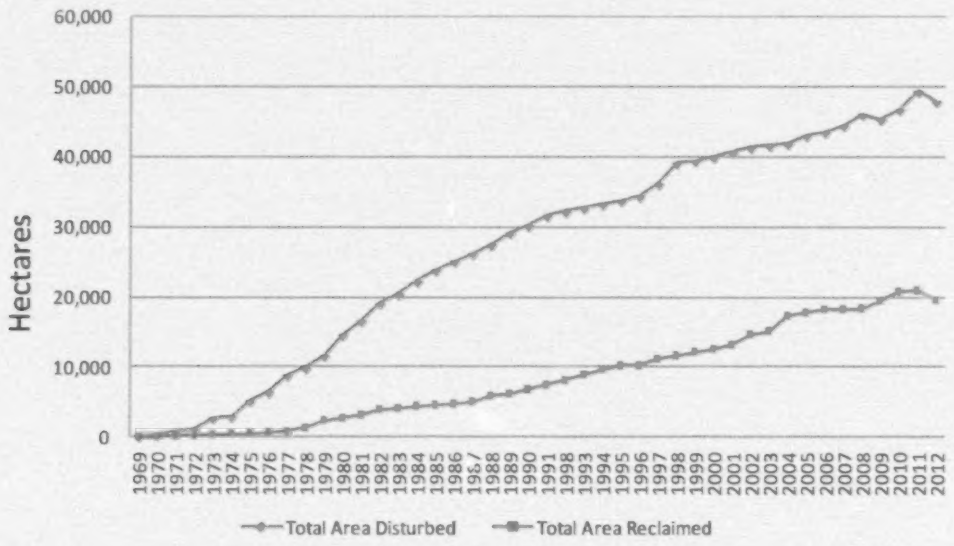


Figure 5: Area Disturbed and Reclaimed by Metal and Coal Mines in B.C. (1969–2012)

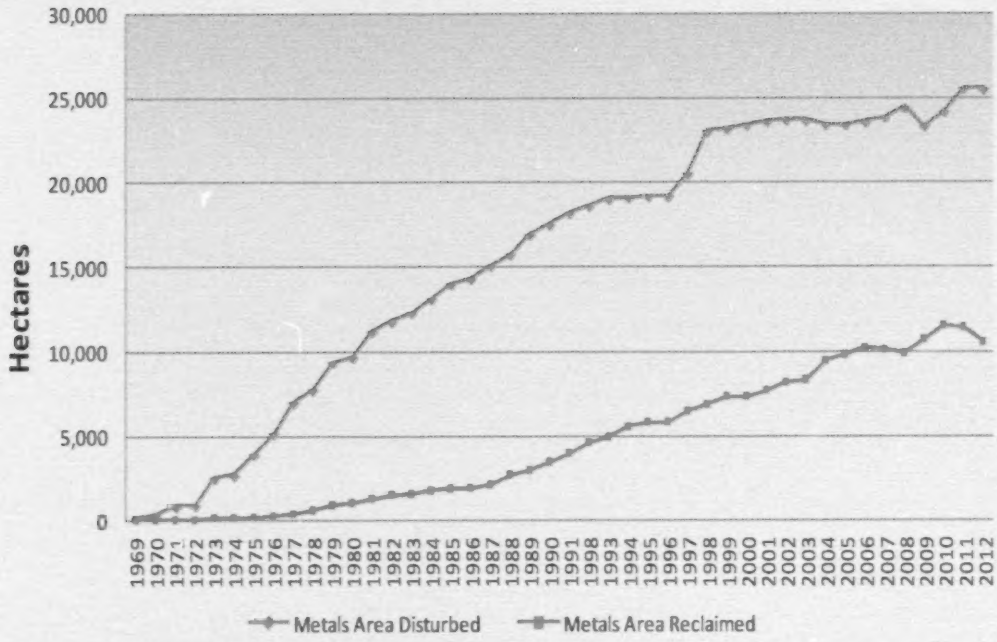


Figure 6: Area Disturbed and Reclaimed by Metal Mines in B.C. (1969–2012)

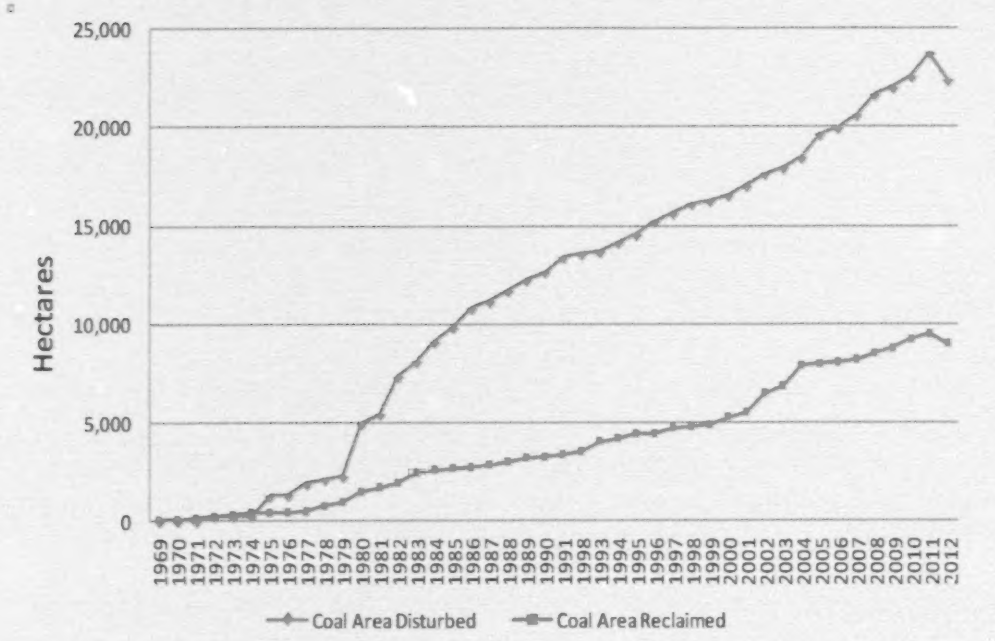


Figure 7: Area Disturbed and Reclaimed by Coal Mines in B.C. (1969–2012)

4.4 Geotechnical

4.4.1 Roles and Responsibilities

The Geotechnical Section is responsible for completing inspections at operating and closed mines with the focus on performance of tailings dams, waste rock dumps, open pit slopes, and underground openings. Mining projects are reviewed for the health and safety of the public and mine workers, as well as protection of the environment.

The Geotechnical Section provides technical review of proposed mine projects seeking approval under the B.C. Environmental Assessment Act and the Mines Act. The section also reviews geotechnical incidents and responds to mine enquiries.

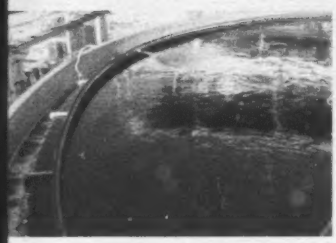
The Geotechnical Section provides geotechnical advice and policy development for:

- Tailings impoundments and dams;
- Waste rock and overburden dumps;
- Open pits and underground developments;
- Mine roads;
- Risk evaluation for worker protection and public health and safety; and,
- Assessing the environmental impact of geotechnical projects.

4.4.2 Summary of Activities

In 2012, the Geotechnical Section:

- co-ordinated 26 geotechnical inspections by ministry staff and contractors covering all of the major operating mines;
- developed geotechnical permit conditions for the construction and operation of major mine structures including tailings impoundments, pit walls, and waste rock dumps;
- undertook environmental assessment reviews for new mine projects; and,
- reviewed annual reports for tailings facilities, waste rock dumps and pit walls.



5 For More Information

Ministry Resources

Information about the Ministry of Energy and Mines and copies of Ministry publications are available from the following resources.

Ministry Website

www.gov.bc.ca/ener

Queen's Printer Publications Index Website

www.crownpub.bc.ca

Enquiry BC

Enquiry BC is a provincial call centre that, on behalf of provincial government ministries, provides services to all British Columbia residents, Crown corporations and public agencies. Hours of operation for Enquiry BC are 7:30 a.m. to 5 p.m., Monday through Friday.

- In Victoria: 250-387-6121
- In Vancouver: 604-660-2421
- Elsewhere in British Columbia: 1-800-663-7867
- Outside British Columbia: 1-604-660-2421
- Email address: EnquiryBC@gov.bc.ca

Telephone Device for the Deaf (TDD)

- In Vancouver: 604-775-0303
- Elsewhere in British Columbia: 1-800-661-8773

Mining Operations

Further information on the activities of the various mining companies can be found in the Canadian and American Mines Handbook, which is published annually by Northern Miner Press at www.northernminer.com, or from individual mining operations.

In addition, you can contact the Mining Association of British Columbia (MABC) (www.mining.bc.ca) and the Coal Association of Canada (CAC) (www.coal.ca) for annual reports on the status of those sectors.